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Usability Analysis of Learning Device Monitoring Systems: Evaluation of User Experience for the Effectiveness of Educational Digitalization

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Abstract

This study aims to analyze the usability level of the learning tool monitoring system developed to support the digitalization of learning administration management in the educational environment. Usability is a crucial aspect in the successful implementation of the system, because it is directly related to the convenience, comfort, and effectiveness of use by teachers, supervisors, and education staff. This study uses a descriptive quantitative approach with evaluation instruments that refer to six usability characteristics, namely appropriateness recognizability, learnability, operability, user error protection, user interface aesthetics, and accessibility. Data was collected through the distribution of questionnaires to the respondents of the users of the system, and analyzed using descriptive statistics. The results of the analysis show that the system has an average usability value of 4.50 or 90.04%, which is classified as very good. The characteristics with the highest scores were accessibility (90.64%) and user interface aesthetics (90.42%), while the lowest scores were appropriateness recognizability (89.57%). These findings indicate that the system has met most of the users' expectations, especially in terms of the interface appearance, ease of access, and learning process of using the system. However, the aspects of function recognition and navigation still need to be slightly improved to be more optimal.

Keyword: Usability, Monitoring System, Learning Tools, Educational Digitalization, User Experience

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INTRODUCTION

In the era of digital transformation of education, the use of information technology has become one of the main pillars in improving the efficiency and quality of education management (Alenezi & Akour, 2023). One form of utilization of this technology is the development of the Learning Device Monitoring System, which is a digital system designed to assist educational institutions in managing and monitoring the completeness and suitability of learning documents prepared by educators (Teng & Wang, 2021). This system is important because learning tools such as Learning Implementation Plans (RPP), syllabus, teaching modules, and assessment instruments are strategic components that determine the direction and quality of the implementation of the teaching and learning process (Subiyantari et al., 2021).

The Learning Device Monitoring System not only functions as a digital storage medium, but also as a quality control tool that allows school leaders, supervisors, or management to systematically evaluate documents compiled by teachers (Habrusiev et al., 2021). Through this system, the monitoring process becomes more structured, well-documented, and can be carried out in real-time (Issa, 2021). In addition, this system also opens up a space for collaboration between educators and management in improving the quality of teaching tools through documented feedback and revision features (Santos et al., 2021). The development of this monitoring system is also very relevant to the demands of the 2003 Law on the National Education System, which emphasizes the importance of developing the potential of students through a quality learning process (Pratiwi, 2023).

The importance of using the Learning Device Monitoring System is also closely related to the demands of the 21st century learning paradigm, which emphasizes the importance of personalization, collaboration, and continuous evaluation (Kumar, 2023). By utilizing this system, teachers can more easily adapt their teaching tools to the needs and characteristics of students, as well as monitor the effectiveness of the teaching methods used. For this reason, the Learning Device Monitoring System is not only an administrative tool, but also a means to improve the quality of learning in a sustainable and measurable manner.

However, the existence of this system often faces challenges in its implementation, especially related to usability or ease of use of the system (Limniou, 2021). Many teachers or education staff have difficulty accessing, uploading, or navigating the system due to a less intuitive interface design, confusing workflows, or minimal documentation of usage (Walther et al., 2022). This condition can hinder the initial purpose of the system, which is to increase the effectiveness of the management of learning tools, and even potentially cause user resistance in the long term (Zou et al., 2025). For this reason, a thorough usability evaluation is needed to

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identify the weaknesses of the system and formulate improvement steps that are more user-friendly and in line with the needs of users (Mohd & Murad, 2022).

Usability or usability of the system is a crucial factor that determines the extent to which an information technology system can be accepted and used optimally by its users (Menant et al., 2021). The principle of usability includes several aspects, including readability, efficiency of use, memorability, frequency and level of user errors, and overall satisfaction (Alsyouf et al., 2023). By analyzing usability, educational institutions can gain a deeper understanding of user perceptions and experiences of the system, and can identify parts of the system that need improvement (Kešelj et al., 2025). One method that can be used to evaluate the usability of the system is a heuristic evaluation, which involves experts in the field of human-computer interaction to evaluate the interface and functionality of the system based on established usability principles (Daramola et al., 2017). This evaluation can produce concrete recommendations for system developers to improve the quality of the system.

In the context of education, it is important to ensure that the developed system is truly accessible and utilized by all stakeholders, especially teachers as the main users (Mohd & Murad, 2022). Therefore, the usability analysis of the Learning Device Monitoring System is a strategic step that is not only technical, but also has an impact on the success of learning management as a whole (Hernowo et al., 2022). The results of this analysis can be used as a basis for decision-making for improving system design, developing user training, and technology implementation policies in the educational environment(Ekuase-Anwansedo et al., 2021). The system's usability can be measured either automatically or manually, employing tools or evaluations derived from end-users or experts (Marthasari & Hayatin, 2021).

By conducting a systematic study of the usability aspect, this article aims to provide an objective overview of the advantages and disadvantages of the monitoring system of learning tools currently used. This research is expected to be able to contribute to the development of a more adaptive, inclusive, and user-friendly educational information system, so as to be able to support the achievement of educational goals more effectively and efficiently in the digital era.

METHOD

This study uses a quantitative descriptive approach with the aim of analyzing the usability level of the Learning Tool Monitoring System used by educators in the educational institution environment. The focus of the research is directed at assessing user perceptions of the convenience, efficiency, and convenience of using the system, in order to identify aspects that need to be improved to support the effectiveness of the implementation of learning technology.

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The main instrument in this study is a questionnaire prepared based on the System Usability Scale (SUS) framework, which is an international standard measuring tool to assess system usability. The SUS consists of 10 statements on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree". This questionnaire measures five main aspects of usability: learnability (ease of learning to use the system), efficiency (efficiency of use), memorability (ease of remembering how to use), errors (number and type of errors that occur), and satisfaction (user satisfaction).

The population in this study is educators (teachers/lecturers) who actively use the Learning Tool Monitoring System in certain educational units. The sampling technique was carried out by purposive sampling, with the following criteria: (1) the educator has used the system for at least one semester, and (2) is willing to fill out the questionnaire completely. The minimum number of respondents is determined to be 30 people to meet the requirements for statistical validity of usability measurements.

Data collection is carried out through the distribution of questionnaires in the form of digital forms, which allow respondents to provide answers anonymously and flexibly. In addition, semi-structured interviews were also conducted with several users as complementary data to strengthen quantitative findings with a qualitative perspective. This interview aims to delve deeper into users' experiences, constraints, and expectations for future system development.

The data obtained was analyzed quantitatively using SUS score interpretation guidelines. The scores of each respondent were calculated and converted into a scale of 0–100, then averaged to obtain the general usability value of the system. Interpretation is carried out based on standard categories, where a score of ≥70 indicates that the system has good usability, while a score of <70 indicates the need for improvement. Qualitative data from the interviews were analyzed using thematic analysis techniques to identify key themes related to user perceptions and experiences.

The results of this analysis are then used as a basis for developing strategic recommendations for the development of a more user-friendly system, as well as a reference for policy makers and educational technology developers in implementing an effective and efficient monitoring system in the future.

Table 1. Usability Aspect Instruments

No.	Usability Aspects	Description	Question Item
1	Appropriateness recognizability	Products according to the needs of users.	5

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2	Learnability	The software's ability to use the product or system with effectiveness, efficiency, risk-free and satisfaction in a particular context of use.	5
3	Operabilitas	The software's capabilities are in ease of operation and control.	5
4	User Error Protection	System capabilities in user error protection.	5
5	User Interface Aesthetics	The user interface allows for a pleasant and satisfying interaction for the user.	5
6	Accessibility	Software capabilities in ease of access.	5

User responses are seen based on a questionnaire that uses a Likert scale with 5 alternative answers and has different score levels. Usability testing with the Likert scale uses a scale of 5 with a breakdown of category answers.

Table 2. Usability Aspect Instruments

Category	Score
Strongly agree	5
Agree	4
Nervous	3
Disagree	2
Strongly Disagree	1

Source: Sugiyono (2014)

RESULTS AND DISCUSSION

The research that has been carried out has resulted in the development of a learning tool monitoring system that can be used in managing, evaluating, and improving the effectiveness of the use of learning tools in schools. This system is designed to provide convenience in recording, monitoring, and reporting the condition of completeness and utilization of learning tools.

System Implementation Overview

The development of this monitoring system is carried out by combining prototype, R&D and ADDIE models which begin with the stage of collecting data on needs which is used as the basis for system design and then tested using the ISO 25010 standard which is validated by

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experts and tests and teachers' readiness to use the information system. The implementation of the system can be seen in Figure 1.

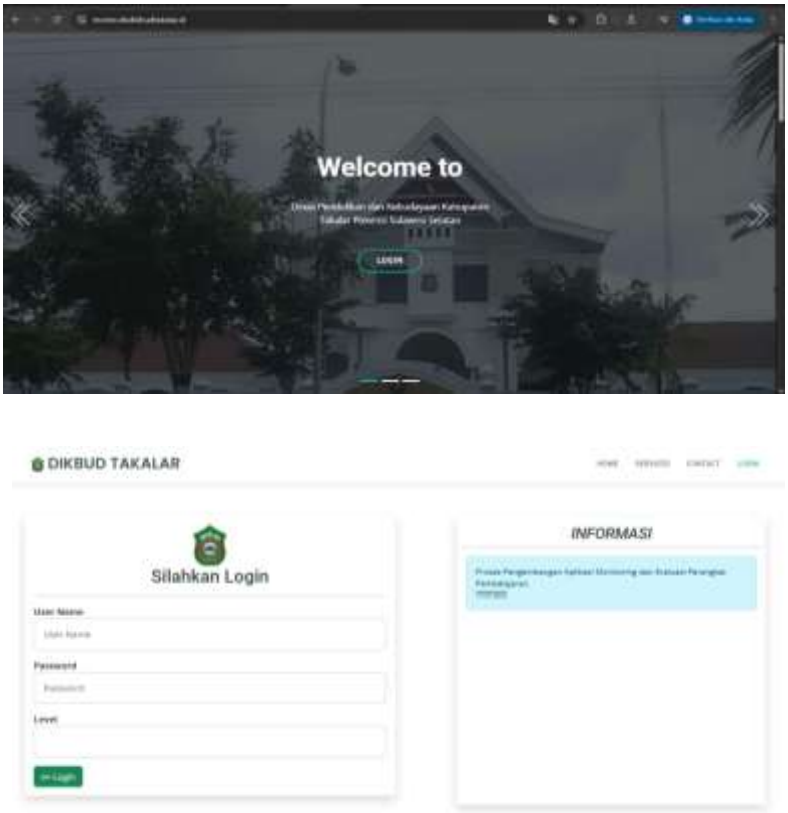


Figure 1. Login Page View

Figure 1 above is a view of the login page of the learning device monitoring system. In this form, there is a user, password, level and login button. The login button is used to access the next page according to the level entered by the user and there is also information. Login button functions to enter the application according to the level rights that have been given (Pensabe-Rodriguez et al., 2020). The application display is designed with a simple design and is easy to understand by the user.

The learning device monitoring system is a system developed to make it easier for users in terms of monitoring and completeness of learning tools for teachers. This system has 5 user levels, namely the admin level, the teacher level, the school level, the supervisor level and the principal level. The system that has been developed at the admin level can access the profile

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data of all levels, set the monitoring schedule, view all the learning tool files, download files, and view the results of the assessment. Teacher levels can manage profiles such as available biodata, upload files, view assessments, and archive learning tools. The main view of the information system can be seen in Figure 2.

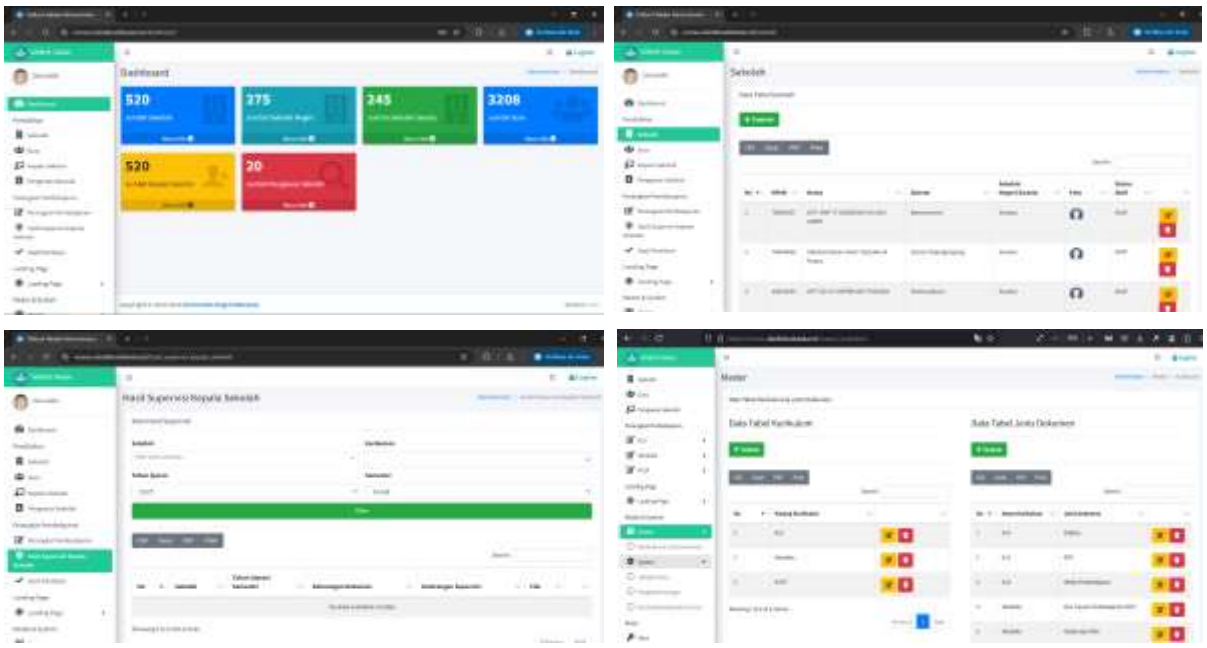


Figure 2. Main Menu View

Information Systems Usability Analysis

Table 3. Usability Analysis Results

No	Characteristics	Average	Percentage (%)
1	Approriatenes recognizability	4,48	89,57
2	Learnability	4,51	90,15
3	Operability	4,49	89,72
4	User error protection	4,49	89,88
5	User interface aesthetics	4,52	90,42
6	Accessibility	4,53	90,64
Total		**4,50**	**90,04**

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Based on the results of the usability evaluation of the Learning Device Monitoring System, data were obtained from six main characteristics that reflect the level of usability of the system in general. Each characteristic is measured using an average scale and percentages to show the level of achievement based on user perception. The first characteristic, Appropriateness Recognizability, showed an average score of 4.48 with a percentage of 89.57%. This reflects that users consider the system to be quite appropriate in presenting functions that are appropriate to the context of their use and are easily recognizable for their purpose. The second characteristic, Learnability, obtained an average score of 4.51 or 90.15%. This shows that the system is relatively easy for users to learn, especially educators, so the process of adapting to the system is relatively fast without the need for intensive training. The third characteristic, Operability, recorded an average score of 4.49 and a percentage of 89.72%. This means that the system is considered easy to operate by users in performing basic tasks such as uploading documents or validating learning devices.

Furthermore, User Error Protection also obtained an average score of 4.49 with a percentage of 89.88%, indicating that the system has been quite good at helping users avoid errors or provide warnings when input errors occur, although there is still room for improvement. The fifth characteristic, User Interface Aesthetics, showed the second highest score with an average of 4.52 and a percentage of 90.42%. This indicates that the appearance of the system interface is considered attractive, comfortable to see, and visually supports the user experience. The last characteristic, Accessibility, obtained the highest score among all indicators with an average of 4.53 or 90.64%. This shows that the system has provided easy access for various types of users, including in terms of devices and the availability of responsive navigation features.

Overall, the total average usability of the system is 4.50 with a percentage of 90.04%, which indicates that the system has an excellent usability rate. This value reflects that the system has met most of the user's expectations in terms of convenience, convenience, and effectiveness of use. However, continuous evaluation is still needed to maintain and improve the quality of the system to remain adaptive to evolving user needs.

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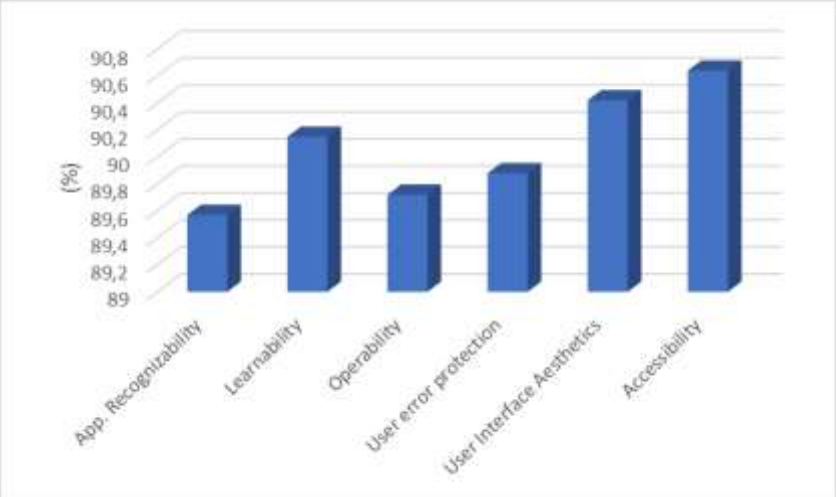


Figure 3. Usability Test Results Graph

The results of the usability evaluation showing an average score of 4.50 or 90.04% overall indicate that the *Learning Device Monitoring System application* has managed to meet most of the users' expectations in terms of ease, efficiency, and comfort of use. This achievement has a number of important implications both practically and strategically for the development of the digital education system, especially in the context of improving the quality of learning management in education units.

In general, the findings of this study show that the application of the Learning Device Monitoring System has been on the right track in supporting the digitization of learning management in the educational environment. However, to ensure the sustainability of the use and improvement of the quality of the system, it is necessary to conduct periodic evaluations, involve users in system improvements, and ensure that the system remains responsive to changing needs at the educational institution level. In addition, the results of this research can be the basis for the development of evidence-based education digitalization policies, which place user experience at the center of educational technology development.

CONCLUSION

Based on the results of the analysis of usability data on the Learning Device Monitoring System, it can be concluded that the developed system has a very good level of usability. This is reflected in the overall average value of 4.50 or 90.04%, which indicates that the system has met user expectations in terms of convenience, clarity, convenience, and effectiveness of use.

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Each usability characteristic showed high results, with the indicators of Accessibility (90.64%), User Interface Aesthetics (90.42%), and Learnability (90.15%) as the three highest components. These findings show that the system is very accessible to a wide range of users, has an attractive and intuitive interface, and is easy to learn even by new users. This is the main force that can encourage the adoption and sustainable use of the system in the educational environment.

In addition, the aspects of Operability (89.72%) and User Error Protection (89.88%) also show that the system is easy to operate and quite reliable in minimizing user error. This is important in the context of the world of education, where system users come from diverse technological backgrounds. Meanwhile, although Appropriateness Recognizability (89.57%) is the lowest indicator, it is still relatively high and shows that the system has been good enough to present relevant and easily recognizable features by users.

In general, the system has met the basic principles of usability and is worthy of continued use and development. However, for continuous improvement, minor improvements are needed, especially in terms of icon clarity and feature navigation, as well as regular evaluation involving user feedback to keep the system adaptive to evolving needs. Thus, the results of this study not only provide an overview of the quality of system usability, but also provide a solid basis for decision-making in the further development of learning technology systems in educational institutions.

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